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Comparative evaluation of nano-hydroxyapatite and fluoride varnish in remineralization of early enamel lesions: A Clinical approach

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Introduction: Dental caries remains a prevalent oral health challenge globally, particularly in early enamel demineralization stages. Traditional fluoride therapies have shown significant success, but recent developments in nano-technology, such as nano-hydroxyapatite (n-HAp), offer a promising biocompatible alternative. This study aims to compare the effectiveness of nano-hydroxyapatite and fluoride varnish in remineralizing incipient carious lesions.

Methodology: A randomized controlled clinical trial was conducted with 90 participants aged 18–30 years, each exhibiting at least two white spot lesions (WSLs) on anterior teeth. Participants were divided into three groups: Group A received 5% sodium fluoride varnish, Group B received 10% nano-hydroxyapatite paste, and Group C (control) received no treatment. Applications were performed once weekly for four weeks. Lesion assessments were conducted using DIAGNOdent readings, visual-tactile inspection, and digital photography at baseline, after four weeks, and at a 3-month

Results: Both treatment groups demonstrated significant improvement in DIAGNOdent scores and visual appearance of WSLs compared to the control. Group B (n-HAp) showed slightly superior remineralization efficacy than Group A (fluoride), with fewer instances of surface roughness and better patient compliance.

Conclusion: Nano-hydroxyapatite presents a clinically effective and patient-friendly alternative to traditional fluoride varnish for the remineralization of early enamel lesions. Its biocompatibility and aesthetic benefits make it a valuable addition to minimally invasive dentistry. Further longitudinal studies are warranted to confirm long-term outcomes and caries prevention.

Biography

Lisa Schneider, DDS, PhD, is a practicing dental researcher and clinician based in Munich, Germany. She holds a doctorate in dental sciences from Ludwig Maximilian University of Munich and specializes in preventive dentistry and biomaterials. Her research focuses on nano-dentistry, enamel regeneration, and public oral health innovations. Dr. Schneider has published multiple peer-reviewed articles and is actively engaged in mentoring young dental researchers across Europe. Her clinical insights and academic contributions continue to shape minimally invasive dental strategies worldwide.

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